ANNUAL REPORT

84- 5078 /

THE MINISTRY OF ENERGY
FISCAL 1983-84
Annual Report

THE HONOURABLE PHILIP ANDREWES
Minister of Energy

Sir:
I have the honour to submit for your approval the 1983-84 Annual Report of the Ministry of Energy.

I would like to note that during this year, the ministry began to implement a new organizational structure that will become fully operational during the next fiscal year. I feel this structure will allow the ministry to maintain a better balance between the various aspects of its mandate in a changing energy environment.

I have every confidence that these changes will enhance our current high level of service to all our client groups as evidenced in this report.

Respectfully submitted,

Duncan Allan
Deputy Minister

THE HONOURABLE JOHN B. AIRD, O.C., Q.C., L.L.D.
Lieutenant Governor of the Province of Ontario

May it please Your Honour:
For the information of Your Honour and the Legislative Assembly, I have the privilege of presenting the Annual Report of the Ministry of Energy for the fiscal year ending March 31, 1984.

May I respectfully draw Your Honour's attention and that of the Legislative Assembly to the fact that this report provides information on the directions of the ministry's policies and program thrusts.

May I also draw your attention to the fact that the ministry has started to implement a new organizational structure to improve its role in addressing the changing energy environment and to co-ordinate more effectively the various services of the ministry.

Respectfully submitted,

Philip Andrewes
Minister of Energy

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The Front Cover

Water power, the original fuel for Ontario's electricity system, generates about one-third of the province's power requirements today. Ontario still has many undeveloped sources of water power. Streams, rivers, waterfalls and old dam sites can produce cheap, renewable and dependable power for small communities, industries or even single homes.

Energy Ontario

Securing Ontario's Energy Picture

Shifting international, national and provincial conditions influence Ontario's energy scene. The ministry assesses supply, demand and pricing variables to formulate policy positions for the Ontario government on electric power, crude oil, natural gas, petroleum products, coal, lignite, peat and uranium.

Sound Analysis for Energy Strategies

Developing Ontario's energy policies and strategies requires sound analysis of the price trends, sectoral demand for, and supply of, various types of fuel. During the year, the ministry compiled a report on future prices for international oil, domestic crude oil and natural gas at the wholesale level, as well as retail prices for petroleum products, natural gas and electricity.

It also prepared long-term demand projections for Ontario's major energy sources used in space heating and cooling, transportation and industrial processes. The findings were submitted to the National Energy Board as part of a review of Canada's long-term energy supply/demand balance. The ministry's "Medium-Term Planning Guidelines", published during the year, outlines ministry objectives, planning themes and key activities for the next three to five years.

Many of the ministry's policies and programs are implemented through other agencies such as the Ontario Energy Corporation and Ontario Hydro, with whom the ministry maintains regular contact.

Maintaining Fair Energy Prices

Part of the ministry's mandate is to maintain fair energy prices to the consumer and ensure that Ontario residents have access to a variety of fuel options.

Electric power rates are an important factor in consumers' energy security. As part of his statutory obligations, the Minister of Energy referred Ontario Hydro's 1984 electricity rates proposal to the Ontario Energy Board for review in early 1983. The Board reported its recommendations in August, 1983.

The ministry also monitors and attempts to influence negotiations of the pricing agreements between the oil and gas producing provinces and the federal government to protect Ontario interests.

During 1983-84, oil and gas prices stabilized instead of rising as had been anticipated in the National Energy Program and the Canada-Alberta Energy Pricing and Revenue Sharing Agreement of 1981. To assess the impact of the changed circumstances for Ontario, the ministry began a major review of oil and gas pricing options in cooperation with the Ministry of Treasury and Economics.

The results of the study were incorporated into Ontario's position in the natural gas industrial incentive pricing discussions that followed the June 30, 1983 Amendment. The negotiations between the federal and Alberta governments on incentive pricing continued through 1983-84.

On behalf of Ontario's petrochemical industry, the Ministries of Industry and Trade and Energy made a submission to the federal Petrochemical Industry Task Force on behalf of the Province. The provincial position emphasized the need for competitive feedstock prices to ensure the viability of the industry. The Task Force reported in February, 1984, but the federal government had taken no action by the end of March, 1984.

Energy Board to determine whether the proposals were in the public interest. The OEB released its report in February, 1984, supporting, in principle, the concept of direct purchase. The ministry is reviewing the report in order to provide the government with advice on the Board's recommendations.

The ministry supports the strengthening of Ontario's electrical transmission system and expressed this support in regard to Ontario Hydro's southwestern Ontario transmission route stage proposal and the Hanmer Mississagi transmission proposal.

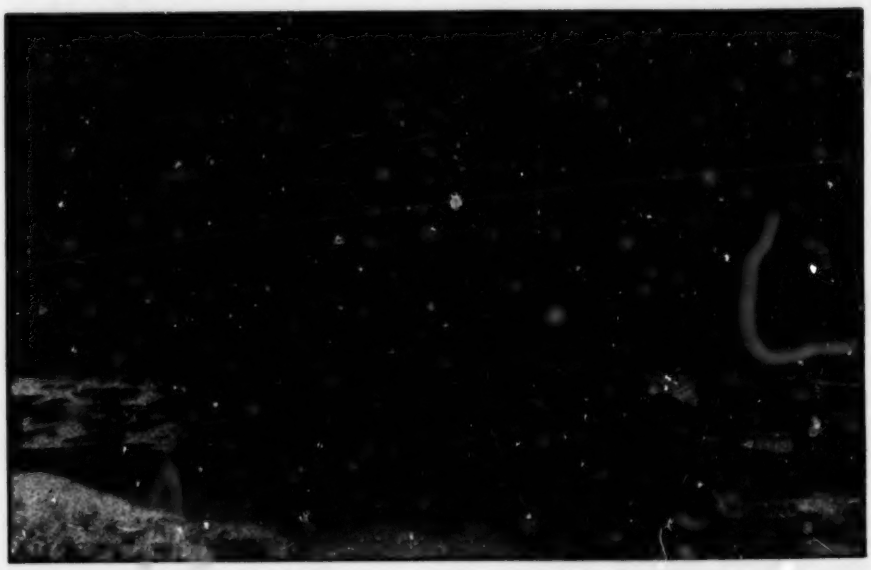
Lower than expected demand for natural gas through the year created producer shut-in problems in Ontario. The ministry worked to develop new sales arrangements between Ontario producers and distribution utilities. The result was improved sales and increased exploration activity.

Planning for Energy Shortages

World energy supply is volatile. The past decade amply illustrates how disruptive periods of energy shortage or perceived shortage can be. The Province of Ontario is preparing contingency plans to respond quickly and effectively to energy supply disruptions.

The ministry monitors changes in the supply and demand of crude oil and petroleum products, for possible forewarning of pending shortages. Three interministerial committees are working with the ministry's involvement to develop contingency plans for the Ontario government's gasoline and heating oil needs.

Working at the federal, provincial, municipal and industry levels, the ministry keeps in close contact with other governments and agencies charged with ensuring adequate service to the public in case of energy shortages.



Working on the Supply Side

During 1983-84, the ministry supported engineering feasibility studies for two Ontario projects requesting funding under the federal distribution system expansion program for natural gas. The result was $40-million in federal grants to expand natural gas distribution to the north shore area of Georgian Bay.

During the year, concern about the price of petrochemical feedstocks led Ontario's gas-based ammonia industry to propose direct purchasing of natural gas supplies from Alberta. In response, the Government of Ontario asked the Ontario

Tapping Conventional Resources for the Future

The ministry works closely with other agencies, like the Ontario Energy Corporation (OEC), to develop conventional and non-conventional energy sources and to increase the opportunities for their use.

In the past year, the ministry has supported activities such as: studies of ways to derive synthetic crude oil from Ontario's oil shales; direct liquefaction of Onakawana lignite to produce oil suitable for upgrading to valuable petroleum products; upgrading lignite by reducing the ash and water content prior to liquefaction; assessing the latest developments in coal combustion technologies for small to medium-size boilers in industries presently using oil.

The OEC, directly and through its interests in Suncor Inc. and Trillium Exploration Corporation, is involved in exploration for oil and gas.

The Ministries of Energy, Natural Resources and Northern Affairs are working together to investigate long-term use of Ontario's peat resources and to identify development opportunities.

Electricity in Our Future

Now in its second year of operation, the Canadian Fusion Fuels Technology Project has established ties with key projects in the international fusion community and has defined the technical areas appropriate for Canadian research and development.

The project, managed by Ontario Hydro, is part of the National Fusion Program and is operating under a five year agreement between the federal government, Ontario Hydro and the Ontario government.

Plasma arc technology is opening up new possibilities for using Ontario's reliable electrical resources in industry. The ministry provided financial support for a technical/economic feasibility study of the technology.

Representing Ontario's Interests

During the year, rates charged by Canada's major oil and gas transmission companies continued to attract ministry attention. Transportation is a significant cost factor. In Ontario, the cost of transportation makes up one-quarter of the wholesale price of natural gas.

The ministry assessed applications before regulatory agencies and represented Ontario at the National Energy Board hearings on rates charged by TransCanada PipeLines Limited, Interprovincial Pipeline and TransQuebec and Maritimes Pipeline. It succeeded in assuring that the interests of Ontario's energy consumers were represented.

Ontario presented evidence on the current cost of capital and the appropriate capital structure for TransCanada PipeLines Limited at its hearing into tolls. The NEB's decision largely reflected Ontario's position.

At an NEB hearing into Interprovincial Pipeline's (IPL) capital structure, rate of return and rate design, the ministry argued that IPL could not justify the proposed increase in the common equity component of their rate of return. The NEB decision closely reflected Ontario's position on the major issues addressed at the hearing.

The ministry presented evidence and cross examined witnesses in the hearing into TransQuebec and Maritimes Pipeline tolls, concentrating on costs included in rates and on appropriate rates of return.

During the past year, a number of significant Canadian electricity export applications were reviewed by the National Energy Board. The ministry paid particular attention to the Hydro Quebec application for electricity exports to determine the implications for Ontario's future electricity supply and export opportunities.

Ontario's Industrial Lifeblood

Energy costs are a part of every economic decision made in Ontario today, particularly in the industrial sector. As Canada's most industrialized province, Ontario depends heavily on energy. Industry uses about 10 per cent of all the crude oil consumed in the province and 40 per cent of the total secondary energy in such forms as electricity, heating oil and gasoline.

The need to remain competitive in world markets fuels the drive to increase energy productivity. Reducing the demand for energy as part of cost control shows astute business management and gives companies a competitive edge. Many Ontario industries belong to the 663-member Canadian Industry Program for Energy Conservation, which this year reports a 15.4 per cent improvement in energy efficiency as compared to its base year, 1972.

Supporting these industries, the provincial energy bus program completed its successful industrial energy advisory program after seven years. Technicians, aboard a bus equipped with energy consumption monitors and computers programmed to analyze consumption patterns, provided energy audits and advice to more than 1,900 companies in the industrial and tourism sectors. Funded by the Ministry of Energy and operated by the Ministry of Industry and Trade, the bus identified potential savings of more than $61-million, almost $30,000 for each company visited.

Putting New Ideas to Work

Monthly fuel bills in the $14,000 range are not uncommon in the concrete block business, but bills in the $1,300 range are. TCG Materials of Burlington slashed their monthly payments to just that. The company did so by going to a bubble curing process for curing concrete blocks, with financial support from the provincial and federal governments. The result was a 90 per cent improvement in energy productivity and increased throughput.

While changes in operations and maintenance practices produce significant energy savings, technology continues to develop new processes and equipment that offer further advantages. To develop market interest, capital assistance is offered to industries wanting to put energy saving technologies to work for them.

Through the federal-provincial conservation and renewable energy demonstration program (CREDA), more than $980,000 were allocated to help establish the credibility of some $7.5-million worth of new industrial technologies.

See Appendix I for a full list of CREDA- sponsored projects.

Two for One

How do you produce useful heat and electricity from a single energy source? By using cogeneration. A company which needs a great deal of steam or heat can also put its fuel source to work to produce electricity. A public utility generating electricity can also add steam or hot water production for public or private use, increasing the overall efficiency of its station.

At the University of Ottawa, cogeneration and heat recovery are combined in an $860,000 integrated energy cascading system. Consumption of natural gas and electricity will be significantly reduced because the process makes efficient use of normally wasted energy. The ministry provided $310,000 toward the installation.

At the University of Western Ontario in London, the ministry contributed $250,000 to a $479,000 steam turbine cogeneration system designed to produce electricity using high pressure steam generated from existing boilers to help save $90,000 a year in energy costs.

The ministry also provided $250,000 to the University of Toronto to install a $629,000, three-phase project—a heat reclamation system, a 500 kW steam turbine generator set and a hot water distribution system—which should produce about $116,000 annually in energy savings.

Changing the Old and Building the New with Conservation in Mind

Many of the existing buildings in Ontario were not designed with energy management in mind. But energy costs for heating, cooling and lighting have soared since most of them were built. The steep increases in costs have made changes in operations and investment in energy-saving retrofitting pay off handsomely.

The ministry is working to develop the technology and increase the use of energy efficient techniques in new and existing buildings and homes throughout Ontario.

Getting the Government's House in Order

In 1976, the Ministry of Energy joined the Ministry of Government Services to introduce practical energy saving measures for operating government buildings. The program exceeded its five-year target of 15 per cent reduction in energy use in less than three years. This success led to the setting of a new target in 1980—29 per cent over the next five years.

In the four years since 1980, energy consumption in 2,937 government buildings was down by almost 30 per cent. The savings totalled almost $54-million. The cost was much less—$19.4-million, almost a three for one return on investment.

Government Savings Exceed Expectations

Government and provincially-funded buildings continue to switch from oil to cheaper and more plentiful fuels. In 1980, the Ontario government set out on a five-year program to convert 338 buildings. By February 1984, a year before the end of the program, 373 buildings had been converted off oil, saving more than 13.6 million litres of oil a year.

Another runaway success is the conservation and off-oil conversion program for government-funded municipal and institutional buildings. In 1981, $12-million was set aside to fund energy saving and off-oil conversions in Ontario schools, colleges, universities, hospitals, institutions and municipal buildings. The program's three-year target was to reduce costs by the annual equivalent of $5-million. After three years, institutional buildings alone have saved more than 63 million litres of oil and almost $5-million.

From the Sanctuary to the Boiler Room

Until recently, religious organizations paid huge portions of their budgets to heat, light and cool their buildings, and did so because they had no other choice. Thanks to a practical program of technical advice and information, many of these same organizations now have a well-organized energy conservation program that's saving them dollars.

The ministry started to work with religious organizations in 1981 and since then more than 350 congregations have appointed energy co-ordinators and more than 1,100 are actively involved in energy management. They share information on their approaches to energy conservation through forums and workshops held across the province.

To support these projects, the ministry published two volumes of quick and useful reference this year: *Energy Saving in Religious Buildings — Putting Practical Ideas to Work.*

Energetic Tale of Two Cities

Owners and tenants of office complexes in Toronto and Ottawa report substantial reductions in their operating costs. How? By actively working to avoid unnecessary energy costs. In 1978, the ministry introduced the Downtown Buildings Energy Conservation Program to encourage volunteer corporate participation in energy management.

Five years later, with little government expenditure, participating companies were saving millions of dollars in energy costs. In 1983, 51 firms, representing 3.3-million square metres of office space in 118 buildings in Ottawa and Toronto, reported savings of more than $8-million annually.

An annual forum is convened in each city to review recent developments in building energy management, case studies, new concepts in computer technology and to discuss employee motivation toward energy conservation in the workplace.

In 1983, as part of the program's fifth anniversary celebration, the ministry presented 32 companies with awards for substantial energy savings and three support organizations received certificates of appreciation.

Introducing New Techniques to the Housing Market

Ontario's new houses can be energy conserving, comfortable and affordable, all at the same time, thanks to improvements in technology, building techniques and design.

The ministry is working with the Canadian Home Builders Association (formerly HUDAC) to stimulate the Ontario-wide construction of affordable low energy new housing built to the R-2000 energy performance standard. By using more insulation, a careful air-tight construction and controlled ventilation, R-2000 homes can save from 50 per cent to 75 per cent of the fuel needed to heat conventional homes.

The ministry sponsors programs to introduce these homes to the market at a price that will encourage consumer interest. The Low Energy/Passive Solar Housing Demonstration Program provided cost-sharing grants of $6,500 per house to encourage the construction of 36 super energy efficient homes in three different Ontario communities.

The Affordable Low Energy New Housing Program stresses builder training to introduce the special techniques and care needed to construct low energy homes. Six two-day workshops were held across the province during the fall, 1983. Armed with the knowledge and subsidies to cover design, 20 builders from across the province are adding 70 low energy houses to Ontario's new home market.

In on the Ground Floor with Remote Housing

The desire to save on energy bills and increase comfort led to an innovative project to retrofit and renovate remote Ontario housing. The techniques are designed specifically for Ontario's northern housing and are expected to produce an excellent payback period — within three years. And the techniques are designed to be affordable too.

The growing need for good standard housing in remote locations will be well served by a new, energy efficient house design, developed for remote Ontario by the ministry. The heating requirements of this design are up to 80 per cent less than those of the majority of remote northern homes. Several of these homes will be ready for monitoring through the 1984-85 heating season.

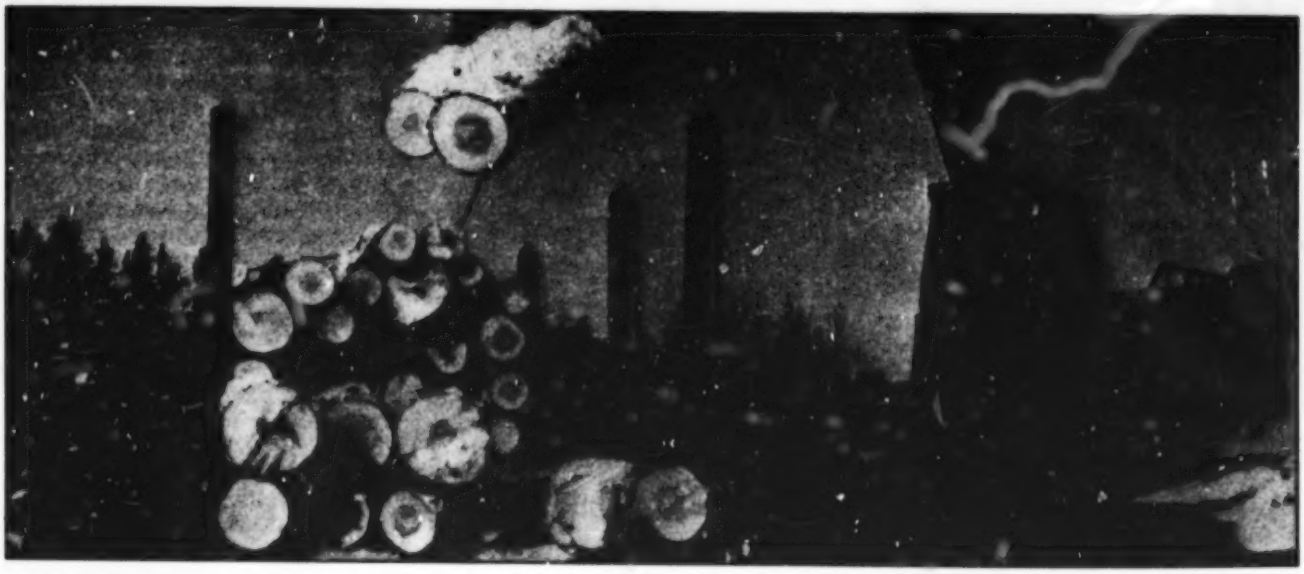
Setting the Standards

With the advent of better sealed homes, the need to maintain a healthy indoor air supply is important, particularly with respect to fossil fuel furnaces. Together with the University of Toronto and Consumers' Gas, the ministry is reviewing the safety aspects of furnaces and other

oxygen-using appliances to ensure that an adequate supply of air can be maintained.

Heat recovery ventilation units, which use the heat in stale air being drawn out of the house to preheat incoming fresh air, are being used in low energy houses and retrofitted homes. The ministry is working with the Canadian Standards Association (CSA) and other agencies to develop performance standards for the design and installation of these devices.

Adding Resources to Our Energy Inventory



By 1995, our discards, such as wood waste, city garbage and agricultural residues, could make up four per cent of Ontario's total energy supply. This is important for the environment as well as energy. Wood and wood waste can also be put to good, energy-producing use with safe, wood energy conversion technologies.

Producing energy from waste and biomass is one more step in a growing provincial movement to reduce waste and landfill needs by recycling and reusing our resources.

Age-old Fuel Adds to Energy Inventory

Ontario's most ambitious wood conversion project completed to date is a $1.3-million central heating system at Kingsway College in Oshawa. A fully automatic system provides low temperature hot water and heating for all 39 buildings on the campus. An on-campus furniture factory supplies 2,000 tons of wood scraps a year for the fuel. The provincial and federal governments provided $550,000 in funding to the project.

Hillcrest high school in Thunder Bay was the first Ontario school to replace natural gas with wood waste – pine bark purchased from a local lumber and planing mill. The $263,000 fully-automated, wood burning system will save $35,000 in annual heating costs. The ministry provided $167,000 toward the cost of the installation.

At the Leslie M. Frost Natural Resources Centre near Dorset, central residential wood-fired heating systems were installed in staff houses to collect performance and emissions data. The ministry will provide this information to homeowners wishing to convert to central wood heating.

The ministry is part of a provincial task force working to review current installation and inspection procedures for residential wood heating systems.

The Ministry of Energy committed $490,000 for a 350kW wood gasifier to generate electricity in the northern community of Ramsey. This will be the first commercial small-scale wood gasifier used in a remote Ontario application.

Mountains of Garbage Can Be Put to Use

The London Victoria Hospital municipal solid waste project received necessary environmental and planning approvals and is moving toward the construction stage. This $35-million, energy from waste facility will burn 270 tonnes of garbage and 160 tonnes of sewage sludge daily to provide the steam and heat requirements for the 900-bed hospital.

The Municipality of Orangeville received $170,000 in federal and provincial funding to increase methane gas production in its water pollution control plant, as a demonstration project. The biogas will augment the plant's electrical heat generation for in-house and district heating of the nearby Princess Margaret school.

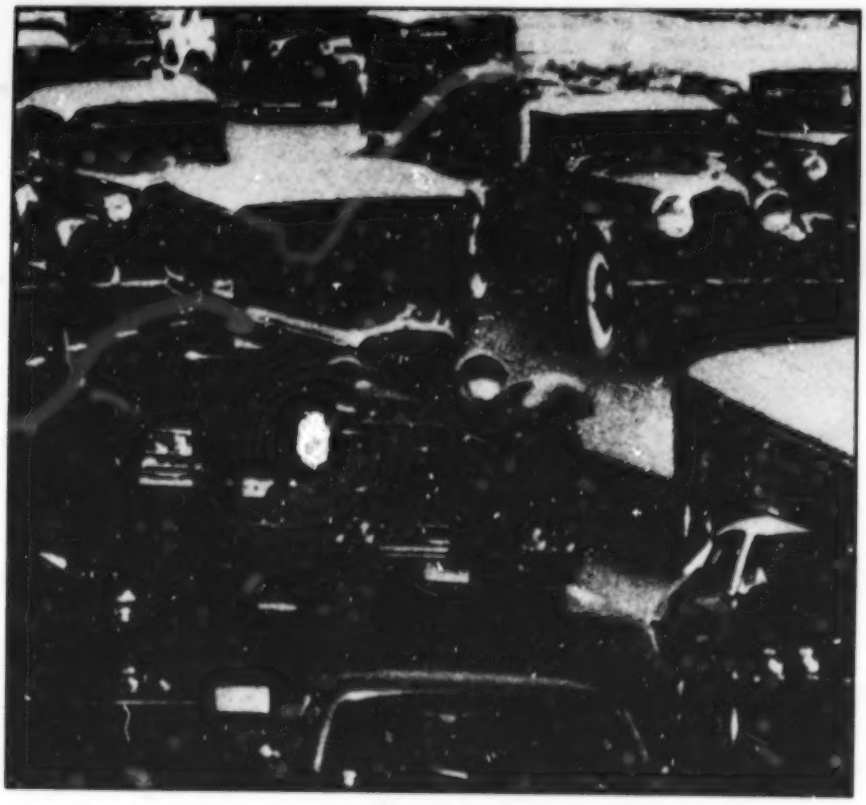
The ministry works with the Ministry of the Environment to help the private sector and municipalities assess and develop energy from waste projects. Municipal solid waste projects are complicated and expensive. They can require lead times of three to seven years and can cost from $10-million to $150-million.

Second Time Around is Added Benefit

Ontario's agricultural industry is energy intensive, but there are ways to reduce farmers' energy costs. The ministry is working to help Ontario's 30,000 commercial farmers develop and use the energy that's available from their own agricultural resources and wastes. The projects are generally small and diverse, the most popular centering around greenhouses, heat pumps, crop drying equipment and methane generation. Their lead times are usually less than a year and their capital cost ranges from $2,000 to $200,000.

The Ministries of Energy and Agriculture and Food are co-ordinating efforts to help the province's greenhouse industry reduce its costs. Through a five-year, $5-million incentive program, grants of one-third the capital cost of installing energy efficient technology are available to the greenhouse industry. Through the year, 85 enterprises received grants to improve their existing greenhouse operations.

Learning a Fuel Efficient Style



No other sector of Ontario's economy has a larger thirst for oil than transportation. Transportation accounts for half the oil used in Ontario today. In 10 years that could build to three-quarters. While there are substitute fuels available, oil still keeps most of Ontario's wheels rolling. And so, the Ministries of Transportation and Communications and Energy work closely with transportation planners, fleet operators, private companies and individual vehicle owners to push fuel efficient practices.

During 1983-84, the DriveSave program provided information on fuel-efficient driving techniques to private vehicle owners and trained more than 380 fleet managers and Professional drivers.

The truckers' 1983 Fuel Economy Challenge attracted 107 truck drivers—50 per cent more than the previous year—who competed in 145 day and night runs to be the most efficient. The challenge is part of TruckSave, a cooperative effort of government, the Ontario Trucking Association and private industry to promote fuel efficiency among truck fleets.

With the Ontario government's support, company-sponsored van pools are adding good fuel savings to Ontario's record. By the end of the year, 16 companies were operating 115 van pools across the province, cutting consumption by almost two million litres (440,000 gallons) per year.

Telephones are playing a big part in cutting transportation fuel needs. More businesses are teleconferencing instead of travelling. A survey of Ontario companies, conducted in 1983 with funding from the Ministry of Energy, showed 72 per cent use teleconferencing, reducing their need for travel by about 19 per cent.

Public Transit Made More Efficient

Even public transportation can implement fuel economy measures. With the ministry's support, major transportation energy management demonstrations were completed in Toronto and in Ottawa-Carleton.

Both studies developed lists of energy saving measures that could be introduced cheaply and reasonably quickly. Computerized traffic signals timed for optimum fuel economy; reduced four-way stops; and enhanced public transit systems are the chief measures being undertaken. Both cities also considered ways to minimize disruption in the event of a fuel supply interruption.

A transportation energy advisory manual and a driver training package were developed for municipal transportation engineers and planners. The manual gives a complete story of transportation energy conservation for municipal governments, from road construction and maintenance through car and van pooling. There are also chapters on transit, contingency planning, fleet management and program implementation. This information is supported by a series of short booklets for elected representatives and community groups.

The training package, "Planning Smarter, Driving Smoother," explains the driver training experience developed in TruckSave and DriveSave to municipal fleet drivers. A comprehensive demonstration of fleet management practices, based on these experiences, is scheduled to run in Sudbury in 1984-85.

The Ministries of Transportation and Communications and Energy also published a new type of map as a guide to intercity public transportation to encourage people to consider public transit for longer trips between towns and cities. The map shows major intercity bus and train routes, scheduled times and stops.

The Here and Now Fuel Substitutes

Why is the Government of Ontario substituting propane and natural gas for petroleum in cars and trucks? Because moving people and goods accounts for half the oil consumed in Ontario and most of it has to be bought outside the province.

Through an aggressive program of financial incentives, research, marketing and information transfer, Ontario has made significant strides in replacing conventional oil-based transportation fuels.

Propane has displaced more than 1.5 per cent of Ontario's gasoline consumption already. Propane-powered vehicles are operating throughout Ontario—more than 50,000 of them—thanks in part to the Ontario government's Drive Propane program and a range of provincial tax incentives for alternative fuels. Three major vehicle manufacturers now offer propane equipment options, with a warranty, on factory-built cars.

The ministry's support for the development of alternative transportation fuel technologies has led to improved performance and efficiency of propane fuelled vehicles.

To help improve availability, the ministry completed a guide to the safe siting of propane fuelling facilities for municipalities and the propane industry and a guide listing more than 700 propane fuel outlets in Ontario for motorists.

Working with the Fuels Safety Branch of the Ministry of Consumer and Commercial Relations, the ministry developed a course curriculum for the S6B certificate program to train inspectors of propane-powered vehicles.

Natural Gas for Vehicles

A program to promote natural gas powered vehicles (NGV) is underway using the Ontario propane program as a model. By the end of 1983, about 200 natural gas vehicles were on the road in Ontario. They are fuelled from one Toronto public fuel dispensing station and several private, fleet-owned fuelling facilities. Several more public fuel dispensing stations should be in operation in 1984.

The ministry is providing support to help develop NGV technologies in order to improve performance and, as use grows, increase manufacturing activities in Ontario.

Improving Current Alternatives

In the past year, the ministry worked with the Ministry of Transportation and Communications to identify some potential areas of performance improvements in propane-powered engines. Propane and natural gas engine fuel systems were tested at the University of Toronto's Engine Research and Development Laboratories. The results showed that efficiency improvements of up to 10 per cent could be achieved through proper tuning of the system.

The Ministries of Energy, Consumer and Commercial Relations and Transportation and Communications continue to make improvement in the safety, quality and performance of present day, propane-powered vehicles an important part of their work. A program to inspect all propane-powered vehicles will be in operation by the fall, 1984. After January 1, 1985, only vehicles displaying an inspection sticker will be able to buy propane fuel.

One barrier to the increased use of propane is the lack of large propane-powered engines for trucks and buses. The ministry allocated up to $230,000 to help the Ontario Research Foundation, Cummins Gas Engines Inc., General Motors-Delco Division and Imperial Oil Ltd. develop a large, propane-fuelled, engine for heavy trucks. In Ottawa, the Ottawa-Carleton Regional Transit Commission (OC Transpo) is undertaking a three year test of 15 propane-powered, transit vehicles with $960,000 in federal and provincial assistance.

The economics of natural gas vehicles depends on a number of factors, including the amount of fuel that a vehicle can carry and the cost of compressing the gas.

The ministry provided funding for research in these areas. The early results of research on the design of natural gas vehicle cylinders and on the storage of natural gas in a carbon-type medium indicates that almost twice as much gas could be stored at intermediate pressures. The Canadian Gas Research Institute is working with the ministry's support to develop an accurate and economical dispensing system for natural gas.

Future Alternatives to Gasoline

The Ontario Energy Corporation (OEC) assessed the introduction of blended and neat methanol fuels to the commercial market, on behalf of the ministry. The results indicated that methanol could play a significant role in helping Ontario meet its transportation energy objectives.

Methanol can be made from Ontario lignite, peat or wood waste. The choice of feedstock and technology and the prospects for Ontario production will depend on other energy price and supply developments.

In the past year, a joint project of the ministry, the federal government, Celanese Canada and Petro-Canada evaluated the performance of a fleet of vehicles using a special gasoline blend containing 4.75 per cent methanol and 4.75 per cent butanol. Vehicles using the blend performed as well as similar vehicles using conventional gasoline.

Suncor of Toronto and Alberta Gas Chemicals of Edmonton provided fuel and technical support for a second major demonstration project using methanol/gasoline blends in government vehicles. No problems showed up with the new fuel.

A joint federal, provincial and private sector project tested the performance of a fleet of vehicles using methanol as a fuel in Ontario's cold climate. Ford Motor Company of Canada provided Ford

Escorts, Shell Canada Limited provided the fuel formulations and lubricants and the Ministry of Energy and the federal government provided project funding. The evaluation indicated that further work is required to ensure that performance is comparable to standard gasoline vehicles.

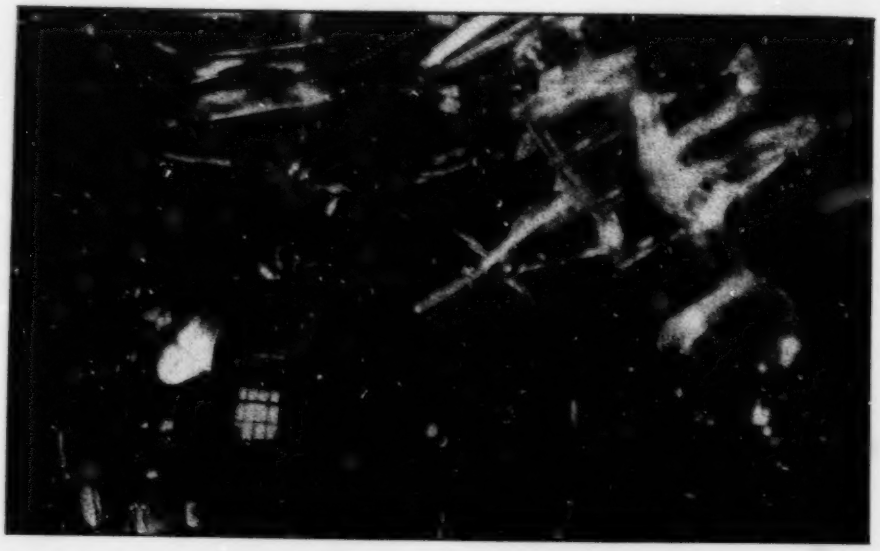
Going Electric on the Road

In the long term, electricity may supplant oil based fuels in transportation. Before that happens though, costs, driving range and vehicle reliability must be improved. The ministry and the Ontario Centre for Automotive Parts Technology have started a project to install electric drive systems in three new Chrysler T-115 vans, which will be operated as mobile laboratories to test advanced battery and fuel cell systems.

Institute for Hydrogen Systems

Developing hydrogen's full commercial and technical potential for transportation applications entails years of research, development and testing. Ontario's Institute for Hydrogen Systems is working to ensure that hydrogen's worth is harnessed for our future. In early 1984, the Institute for Hydrogen Systems moved its headquarters and laboratories to Mississauga. The federal and provincial governments provided $3-million in funding for the Institute's work.

The ministry also funded projects to evaluate safe hydrogen storage systems; develop small scale magneto-caloric refrigerators; and study the industrial requirements for electrolytic hydrogen over the next 20 years.



Developing Cost Effective, Marketable Systems

Water flowing over old dams in Ontario is more than picturesque. It can be good business. Development of water power at these sites can make economic sense for many Ontario municipalities and businesses. The ministry's Small Hydro Development Program is helping to tap some of the hundreds of sites in Ontario that can produce cheap, renewable, dependable power.

Small Hydro is Important Business

The Ministries of Natural Resources and Energy completed an inventory of promising hydraulic sites across the province. A summary of the inventory will highlight 150 sites with significant hydro potential for future development.

Seven existing dam sites are incorporating small hydro systems thanks to $781,000 in support from the Canada-Ontario small hydro demonstration program. These seven join the three already in place under the ministry's micro-hydro demonstration program.

Through a ministry-sponsored assistance program, seven municipalities received grants to determine the economic potential of developing their small hydro capacity.

The ministry's second small hydro conference stressed the economics and business aspects of small hydro development. This year's conference was attended by 325 participants. The export potential of the technologies involved in small hydro is high and offers a promising industrial development opportunity for the province.

At Quetico Park, a small hydro system, which is completely remote from the grid, is providing electricity for a Canada Customs' office and some park buildings.

At Frontier Lodge and Motel, a camp north of Elliot Lake, a micro hydro system, installed with $50,000 in ministry support, will supply 80kW of electricity. The hydro electric system replaces a diesel generator, reducing the need for expensive diesel fuel.

During the year, the ministry provided $200,000, in conjunction with the Ontario International Corporation, to help Barber Hydraulic Turbine of Port Colbourne install a hydraulic system in Jamaica.

Getting the Sun's Information Out

By year end, the sun was heating process water at Cavalier Beverages in Orillia and service water for Comfort Living Co-op in Etobicoke, and drying lumber at Trent Timber Treating in Peterborough.

These are just three of the 25 installations funded under the $1.5-million, phase III of the Canada/Ontario commercial/industrial solar program. The program funds innovative active solar systems in the commercial and industrial sectors. To date, the ministry has shared the cost of 110 solar installations to accelerate this development. In each phase of the program, price and performance have improved, significantly reducing the ministry's share of project costs.

For details on phase III solar projects, see Appendix II.

The cost of solar energy systems has dropped dramatically in the last three years. In the commercial and industrial sectors, the costs of installed systems fell from an average $440 to $123 per annual gigajoule. Ontario's solar industry is striving for further market acceptance and the

Ministry of Energy supports its efforts to develop competitive products and service.

Solar hot water systems can supplement conventional heating systems and are being used in three new municipal senior citizens' homes; the Aquatic Centre swimming pool in Dryden; and four provincial park comfort stations across Ontario.

Photovoltaics — using solar cells to convert sunlight directly into electricity — are being developed for the export market and for use in remote locations in Ontario. During 1983-84, the ministry contributed $79,500 to help develop a photovoltaic-powered water pumping system for domestic and export applications.

The ministry's seminar to review the current technologies of energy efficient housing attracted 375 people in November 1983. Equally well attended were seminars on the technical development of photovoltaics and solar systems operation and maintenance.

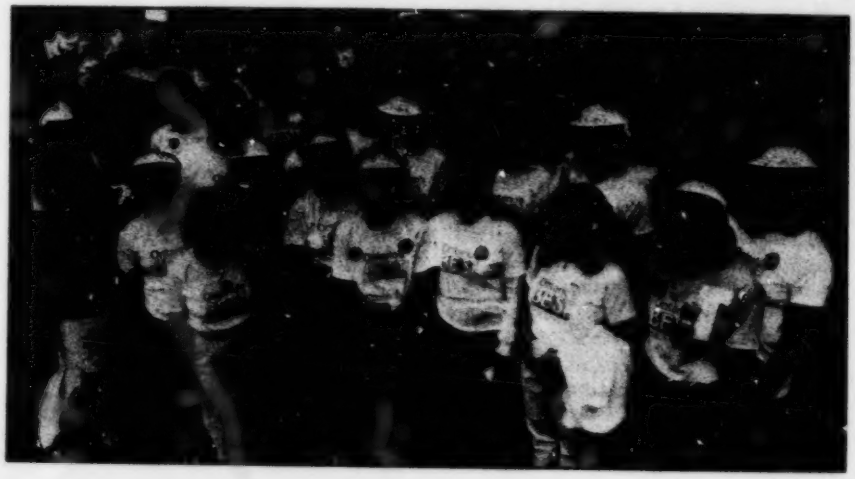
The ministry published the first annual solar monitoring report to provide information on the energy performance of 85 active solar heating systems.

Getting the Energy Message Out

Energy is an unusual Ontario government ministry. Most others have tangible products. You can see the hospitals they fund or drive on the roads they build. But the Ministry of Energy's "product" is transparent and hard to define. To many people it's heat, light or transportation. To others, it's a fuel, like oil, gas or coal. Some think of it as a business, some as a cost of doing business.

Ministry communications must address the different ways people think of energy and its message must be clear. As a source of expert advice, the ministry provides factual information in many different formats to help private and corporate citizens make better energy-related decisions.

The ministry published the third edition of the *Ontario Energy Review*, which summarizes Ontario's energy situation and provides a wide range of data on supply and demand for various sources of energy in the province. *The Homeowners Off-Oil Heating Conversion Decision* was updated and a companion document, *The Off Oil Handbook*, was released. These two sources of consumer information are directed to people considering heating conversions.



Reaching Tomorrow's Consumers Today

A lively approach to introducing an energy conscious lifestyle to younger children is "The Conserving Kingdom", a modern fable starring a dragon, a king, a princess and a prince. Actors use mime, mask, puppetry and song to tell the story of two kingdoms and how the inhabitants use or misuse their energy resources. A question and answer period follows the production and an educational kit is available for classroom followup. The play will preview before children in grades three to six during the 1984/85 school term.

The ministry works closely with educators to provide resources and support for teaching young people. Two hundred and fifty teachers attended the annual Energy Educators of Ontario conference. Two more posters and a teachers' guide were added to the ministry's colourful collection of energy teaching aids. A secondary school energy curriculum, *Energy in Society II*, developed by the Ministries of Education and Energy, will be published in 1985.

The Energy Educators of Ontario network, funded by the Ontario government, is an information sharing organization for energy educators. Information exchanges with similar groups in Canada and the United States resulted in plans to initiate an international energy educators organization.

People make the Difference

With more than 80,000 employees, the Ontario government is promoting conservation at work, at home and while travelling. The ministry continued to coordinate the Ontario government's employee motivation program — Ontario's Big Energy Saving Team (BEST) — with an eye to setting an example of wise energy use for all Ontario citizens.

In the past year, the program focussed on driving and maintenance practices as ways to save fuel. Over two summers, 1,112 drivers have taken advantage of vehicle emission tests offered at government offices across the province. In a pilot program, 120 government drivers were trained in energy efficient driving tech-

niques. The energy savings were significant.

Awards of Excellence

During the year, the ministry produced 80 publications; 44 exhibits; 15 films, audiovisuals and videotape productions; and answered about 18,000 inquiries from the public.

"Money to Burn", a 28-minute documentary about producing energy from waste, won awards from provincial, Canadian and international communications groups. TVOntario will use "Money to Burn?" as part of an energy series airing in late 1984. Several more ministry films and several poster campaigns were also nominated for awards of distinction.

Toward a Community Attitude

More than one hundred municipal officials gathered at a ministry-sponsored conference in September, 1983, to learn about the experiences of four Ontario cities which developed their own long-term community energy plans.

In 1982, the ministry provided funding to Brampton, Burlington, Ottawa and Stratford to assess their community's needs and respond with practical strategies.

The approaches vary from establishment of energy information centres for individual residents to activities in municipal planning and operations.

Stratford opened an energy centre at City Hall and continues to highlight energy conservation activities through its Energy Week. Ottawa plans to create a one-stop energy centre to advise homeowners. It will also analyze the city's industrial and commercial sectors to determine approaches to energy efficiency. Burlington is working with local residents to highlight individual energy related options and Brampton has incorporated energy conservation into its municipal operations and land use planning.

Information is the Key

In municipal operations, wise energy management starts with identifying energy saving possibilities. That's where trained energy auditors come in. Ontario now has 48 municipal energy auditors, thanks to the Ontario Municipal Energy Audit Program sponsored by the Ministries of Municipal Affairs and Housing and Energy.

Since 1981, the auditors have established energy management programs in 300 municipalities across the province. Their experience and knowledge have been applied to conservation efforts in more than 600 municipal buildings, following audits of more than 3,800 buildings. The Ministry of Energy and participating municipalities share the salary costs of the auditors.

Since 1982, more than 300 municipalities have taken advantage of the ministry's Municipal Oil Conversion and Energy Conservation Program, to save some $4-million by converting from oil and improving energy efficiency in municipal buildings and operations.

A self-help network, set up in 1978 by the ministry and the Association of Municipalities of Ontario, supports in-house and community-wide energy management activities in almost 300 municipalities. Through the program, municipalities can share information and experiences about efforts to establish and operate energy conservation programs.

The community plays a vital leadership role in prompting responsible management of our energy resources. With active ministry support, many local undertakings are paying large dividends.

The Proof is in The Pocketbook

An average Ontario homeowner can easily save up to 20 per cent on heating bills. The trick is to identify the best and most practical ways. The ministry's four-year-old, personalized, residential energy advisory service, Heat Save, does just that. Using heat sensitive photography, called thermography, to illustrate areas of heat loss in individual houses, Heat Save technicians can help homeowners determine their best course of energy saving action.

Twelve more communities were added in 1983-84 to the 27 localities already visited by the travelling clinic. To date, Heat Save has helped cut energy costs and improve home comfort for more than 114,000 people across Ontario.

A small business version of the practical Heat Save approach was tested in North Bay and Cambridge. A walk-through energy inspection highlighted energy and cost saving actions with a payback period of less than three years. Ten local, unemployed people were hired and trained to provide the service during the five month operation. In North Bay, staff inspected 62 businesses during the peak July period.

Job Experience Added Benefit

The ministry also supported other types of community-based energy programs. The municipal utilities' Residential Energy Advisory Program (REAP), sponsored by Ontario Hydro, provides free, in-home residential energy surveys to homeowners. This year it also provided job experience. Through the Board of Industrial Leadership and Development (BILD), the ministry joined forces with Canada Empioyment and Immigration to

provide funding to hire and train 35 people who had exhausted their unemployment benefits. The REAP representatives worked between April and the end of the program in September, 1983.

The City of Toronto's building inspection function now offers advice on energy-efficient renovating. The Energy Conservation Community Outreach Project (ECCO), initiated in 1981 as a joint City of Toronto-Ministry of Energy demonstration project, offered homeowners information about grants, retrofitting, renovation ideas and substitution for oil heating. ECCO gave birth to the city's popular Draftstop program that provided a caulking and weatherstripping service for low income residents over the year.

Pollution Probe's travelling bus, Ecology Express, brought pre-winter conservation and retrofit advice to more than 1,000 people in 15 northern Ontario towns, with financial assistance from the ministry.

The Davenport Conservation Development Program launched an energy awareness blitz of more than 4,000 people in the Davenport area of Toronto. The non-profit, community energy awareness group received financial support from the federal and provincial governments.

Reaching consumers with practical, low cost energy saving ideas is part of an aggressive ministry program to make energy conservation a way of life.

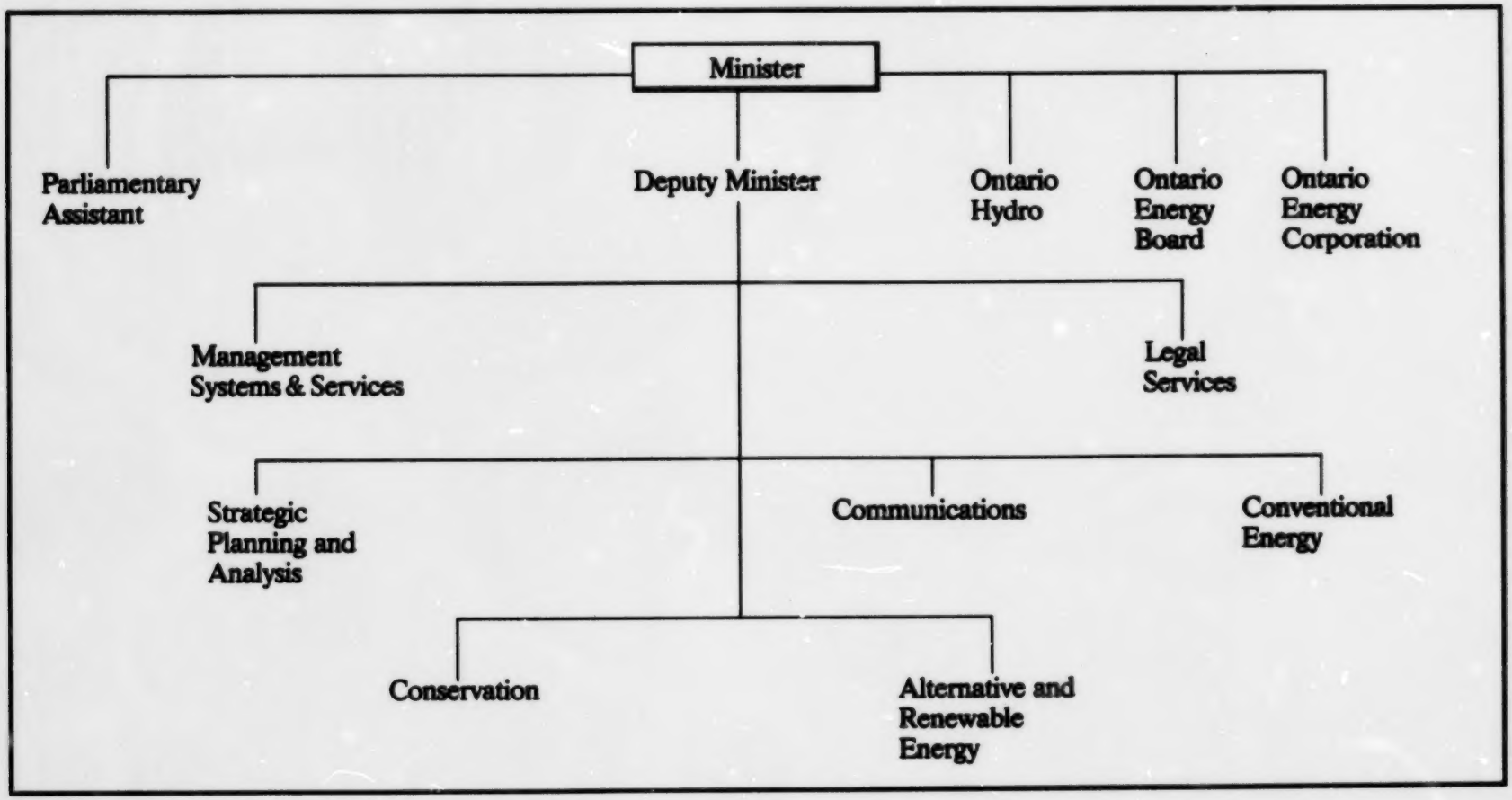
Program Estimates Summary

1984-85 Estimates	PROGRAMS	1983-84 Estimates	1982-83 Actual	1982-83 Estimates
$		$	$	$
7,305,381	Ministry Administration	6,498,800	6,627,511	6,132,400
3,323,200	Conventional Energy	3,170,500	2,349,578	3,218,000
15,998,500	Alternative and Renewable Energy	19,639,900	18,347,209	25,985,900
17,945,900	Energy Conservation	22,321,700	26,839,073	28,862,800
2,565,300	Regulatory Affairs	2,639,400	2,316,426	2,326,700
69,250,000	Energy Investment	83,000,000	55,589,900	62,240,000
116,388,281	Ministry Total	137,270,300	112,069,697	128,765,800
31,981	Less: Statutory Appropriations	30,500	30,500	30,500
116,356,300	TOTAL TO BE VOTED	137,239,800	112,039,197	128,735,300

Accounting Classification

88,588,281	Total Budgetary Expenditure	98,020,300	101,532,497	66,525,800
27,800,000	Total Disbursements	39,250,000	10,537,200	62,240,000
116,388,281		137,270,300	112,069,697	128,765,800

Ministry Organization



CONSERVATION AND RENEWABLE ENERGY DEMONSTRATION PROGRAM (CREDA) 1983-1984

Project	Location	Canada/Ontario Funding	Application
Ontario Hydro Load Management, Field Trials & Monitoring		250 000	Monitoring of energy use in residential areas and study of the potential of load management in these and other residential areas.
Ecology House 1983/84 Operation	Toronto	30 000	Operation of an old house that's been completely redesigned to demonstrate urban conservation, and is also being used as a public information centre.
Hudson's Bay Computerized Energy Monitoring Analysis	15 Ontario locations	30 000	Implementation of an energy management system which involves monitoring 15 commercial Hudson's Bay buildings over the next two years to identify ways to improve energy use.
Cantherm Vertical Heat Pump	Toronto	49 000	Demonstration of the effectiveness of a vertical-loop, ground-source heat pump for space heating and air conditioning in commercial and industrial buildings.
Energy Projects Canada		11 000	Publication of a nationwide tabloid that describes the results of CREDA projects across Canada.
John Deere Welland Stack Gas Heat Recovery	Welland	156 000	Demonstration of a low-temperature flue gas heat recovery system for an industrial boiler application, the first full-scale industrial application of a Canadian-developed control technology.
Bubble Curing for Concrete Blocks	Burlington	567 350	Demonstration illustrating that natural gas used in curing concrete blocks could be substantially reduced by using a continuous warm vapour bubble curing system. Several companies manufacturing cement blocks have shown interest in the process.
High-Temperature Ceramic Recuperation	St. Catharines	35 000	Demonstration of a way to reduce the energy used in the forging process by rebuilding a conventional slot furnace using a ceramic fibre insulation lining. The high temperature heat recuperators will also be installed in the furnaces and gas exhaust train.
Fixed Film Anaerobic Digestion	Millbank	97 800	Funding was provided for a cheese operation to install and demonstrate a Canadian designed fixed film anaerobic system that generates biogas, replacing a major portion of fuel oil requirements.

Project	Location	Funding	Application
St. Lawrence Cement Reclaimed Heat	Mississauga	176 300	Demonstration of techniques for saving energy by producing slag cement rather than Portland, using waste heat and a redundant wet-process kiln for drying.
Hardee Farms Monitoring Program	Lambeth	60 000	Ontario and Ottawa contributed towards monitoring a Canadian-developed system that treats waste water containing high proportions of organic materials in the vegetable food processing industry.
Orangeville WPCP Energy Recovery System	Orangeville	170 000	CREDA helped this Municipality increase digester gas production in its water pollution control plant. Through improved digester mixing, the system will integrate biogas fuel production with electrical heat generation for in-house use. As well, energy will be used for district heating.
University of Ottawa Cogeneration	Ottawa	460 000	Installation of an integrated energy cascading system designed to demonstrate several integrated innovative technologies that operate simultaneously.
Commercial/Industrial Solar Program Phase III	across Ontario	2 000 000	This funding covers grants to 26 participating companies as well as the associated monitoring and information transfer costs. During the course of this program, the average cost of solar installations has dropped from $400 per gigajoule to less than $200 per gigajoule.
Central Wood-Fuelled Heating System	Kingsway College Oshawa	443 000	Demonstration of a fully automatic wood-fired central heating system which supplies low-temperature hot water to 39 campus buildings. The college's furniture factory produces the entire wood waste supply.
Small-Scale Hydraulic Demonstrations	7 locations	950 000	The two levels of government contributed towards the demonstration of small scale hydro potential at several privately-owned, formerly developed sites in the 20 to 1000 kW size range.
Ottawa-Carleton Propane Transit Bus Demonstration	Ottawa-Carleton	950 000	Demonstration and testing of propane-fuelled Regional Transit Commission vehicles.
Ford/Shell Neat Methanol Demonstration	Toronto	103 000	Evaluation and demonstration of the technical feasibility of neat methanol as an alternative transportation fuel in Canada.

Project	Location	Funding	Application
Industrial Heat Recovery System	Toronto	50 000	Demonstration of a unique industrial heat recovery system that will cut energy costs by 40% in a furnace at Stelco Fastener and Forging Company's Swansea plant.
Process Energy Recovery and Recycling System – 3M	London	200 000	Demonstration of process dehumidification and precise humidity control with the use of vapour recompression. A microprocessor will modulate the system to ensure exact drying conditions.
Gasifier/Marketing Demonstration – CMC	Renfrew	1 500 000	Through the BILD program, the federal and provincial governments contributed towards a demonstration of the technical feasibility of a wood-fuelled gasifier in a methanol production system. Also demonstrated will be the use of methanol blends and the use of neat methanol as a motor fuel.
Anaerobic Digestion and Energy Recovery on Dairy Farms	Pitten's Farms Cambridge	185 000	Demonstration of the production of biogas from manure on a 200-dairy cow farm, to produce electricity on the farm. Protein recovery, a significant part of the demonstration, is the first of its kind in Canada.
Computerized Energy Audit System for Industrial Furnaces	Toronto	62 000	Intersteel Consultants received funding to develop an energy optimization system to reduce industrial process heating at Arrowhead Metals.
Microcomputer Monitoring, Control and Reporting System	Toronto	53 000	An engineering company demonstrated an energy monitoring and reporting system in a large offset printing plant in Toronto. The system uses a microcomputer to inform users about the energy lost through unnecessary use of water, natural gas, steam, electricity, and to advise on how to increase energy efficiency.
Ramsey Gasifier Demonstration	Ramsey	490 000	Installation of a 350 kW wood gasifier engine generator system for this small northern Ontario community. Using feedstock from a local timber operation, the system will provide electricity for the community as well as the company operations.
Heat Pump System in Community Centre	Keene	54 280	Demonstration of the technical feasibility and energy benefits of installing three 15 kW Cantherm heat pump systems to dehumidify a community centre. One system is located in the curling rink and two in the hockey arena.

COMMERCIAL/INDUSTRIAL SOLAR DEMONSTRATION PROGRAM 1983-1984

Project	Location	Project Cost	Federal/Provincial Contribution	Application
Albion Comm. Centre Pool	Etobicoke	$ 47 362	$ 31 485	Heat water for swimming pool
Boys & Girls Club of Niagara	Niagara Falls	25 809	16 776	Heat water for swimming pool
Cameron Heights Collegiate	Waterloo	85 000	55 950	Heat water for swimming pool
Carleton University	Ottawa	153 600	98 265	Preheat water for showers and pool
Cavalier Beverages Ltd.	Orillia	178 995	116 347	Preheat process water
Comfort Living Co-op	Downsview	81 915	53 945	Heat domestic hot water
Country Clean Laundry & Carwash	Owen Sound	58 500	38 725	Heat water for carwash and laundry
Deluzio Auto Service	Windsor	48 233	31 351	Preheat water for carwash
E.D. Smith & Sons Ltd.	Winona	371 050	241 783	Preheat process water and boiler feedwater in food process
Kinsmen Club of Leamington	Leamington	59 800	39 570	Heat water for swimming pool
Lindsay Recreational Dept.	Lindsay	45 000	29 500	Heat water for swimming pool
Little's Nursing Home	Windsor	33 464	18 405	Heat domestic hot water, laundry water & water for hydrotherapy
London Hospital Linen Services	London	120 000	78 000	Heat water for laundry
Mavis Street Car Wash	Mississauga	40 270	26 473	Heat water for carwash
Niagara Powermatic	St. Catharines	25 196	16 377	Boiler preheat for carwash
Ottawa Reg. Hosp. Linen Serv.	Ottawa	378 090	245 759	Heat water for laundry
Park Motor Inn	Niagara Falls	25 000	16 250	Heat domestic hot water for hotel use
Park Motor Inn	Niagara Falls	48 666	31 633	Heat water for dishwasher and laundry
Pillar & Post Inn & Restaurant	Niagara-on-the-Lake	26 473	17 207	Heat domestic hot water and water for laundry
Quick Clean Laundromat	Windsor	16 800	10 920	Preheat water for laundry
Recy-Com Ltd.	Mississauga	145 000	94 250	Heat domestic hot water and water for swimming pool
Ridley College	St. Catharines	26 513	17 233	Heat water for dishwasher
Ridley College Pool	St. Catharines	22 096	14 363	Heat water for swimming pool
The St. Elizabeth Home Society	Hamilton	77 000	50 000	Heat domestic hot water and space heating for nursing home
Trent Timber Treating Inc.	Peterborough	68 000	44 400	Preheat process air for timber drying

ONTARIO ENERGY BOARD

The Ontario Energy Board is a regulatory agency of the Government of Ontario whose members are appointed by the Lieutenant Governor in Council under the authority of the Ontario Energy Board Act. Currently, the Board has nine members including a chairman and a vice-chairman. Board hearings are conducted by panels of not less than two Board members. However, the normal practice of the Board is to use three-member panels when practicable. The operations of the Board are supported by a secretariat of about 30 civil servants, all of whom are appointed under the Public Service Act.

The Board is responsible for the determination of rates and charges for the transmission, storage, distribution, and sale of natural gas in the province; for the designation and authorization of natural gas storage areas; for the authorization of the construction of transmission lines; for the authorization of expropriations for natural gas pipelines; and for the approval of franchises of natural gas utilities to serve designated areas. The Board also reviews, at the request of the Minister of Energy, the proposed wholesale rates of Ontario Hydro Corporation and other rate-related matters of the Corporation. In addition, it acts at the request of the Minister of Natural Resources or the Lieutenant Governor in Council on any issue respecting oil, gas, or energy generally.

The impact of the decisions and recommendations by the Board are dealt with elsewhere (see OEB Annual Report). For the purposes of this report, we are solely concerned with the workload of the Board for the fiscal year under review and the related funding provided the Board through the Ministry's estimates.

The Board's processing of applications has been improved by the publication of a Case Management Procedures Manual for Board staff and by providing advance notice of the scheduling of the hearings. Through these initiatives, the Board has been able to handle its growing workload without significant changes in human or financial resources (see Table A).

	1980/81	1981/82	1982/83	1983/84
Cases	81	5	28	42
Sitting-Days	120.5	113.5	97.5	131.0
DIRECT EXPENDITURES	382,496	442,169	540,450	545,571
OTHER EXPENDITURES	1,061,409	1,420,586	1,775,976	2,024,082
TOTAL EXPENDITURES	1,443,905	1,862,755	2,316,426	2,569,653

Table 1
1983/84 PROGRAM RESULTS
RESEARCH AND DEVELOPMENT EXPENDITURES

	1980/81 ($000)	1981/82 ($000)	1982/83 ($000)	1983/84 ($000)	TO DATE ($000)	DEMONSTRATIONS (TO DATE)	APPLICATIONS (TO DATE)	OIL DISPLACED (ANNUALLY)
Solar	2,347.0	4,151.0	5,734.0	3,217.0	15,449.0	7	1,632	33,532 (BBL)
Waste	2,554.0	2,810.0	4,724.0	4,393.0	14,481.0	9	222	110,000 (BBL)
Hydrogen	—	—	972.0	1,554.5	2,526.5	—	—	—
Fusion	61.4	138.7	134.0	185.0	519.1	—	—	—
Remote	—	974.0	767.0	1,272.0	3,013.0	6	35	1,500 (BBL)
Alternatives	—	3,043.0	4,730.0	3,254.5	11,027.5	17	56,401	—
TOTAL	4,962.4	11,116.7	17,061.0	13,876.0	47,016.1	39	58,290	145,032 (BBL)

Table 2
1984 PROGRAM RESULTS
ENERGY CONSERVATION EXPENDITURES

SECTOR	1980/81 ($000)	1981/82 ($000)	1982/83 ($000)	1983/84 ($000)	TO DATE ($000)	OIL DISPLACED (ANNUALLY)	ENERGY CONSERVED (ANNUALLY)
Ontario Gov't Buildings	3,408.5	3,451.9	5,305.8	3,008.1	15,174.3	370,000 (BBL)	406,000 (BOE)
Financial Assistance	1,503.8	3,868.2	7,708.4	4,411.8	17,492.2	1,115,000 (BBL)	578,000 (BOE)
Technology Transfers	1,704.3	2,537.1	3,003.3	3,208.6	10,453.3	3,957,000 (BBL)	542,000 (BOE)
Technology Development	2,706.8	6,089.1	5,706.2	5,013.4	19,515.5	145,032 (BBL)	1,000,000 (BOE)
Education/Awareness	5,313.3	3,944.5	3,303.6	2,506.7	15,068.1	—	—
TOTAL	14,636.7	19,890.8	25,027.3	18,148.6	77,703.4	5,587,032 (BBL)	2,526,000 (BOE)

Table 3
ACTUAL MINISTRY EXPENDITURES

PROGRAM	1980/81	1981/82	1982/83	1983/84	TOTAL EXPENDITURES
Energy Conservation	14,636.7	19,890.8	25,027.3	18,148.6	77,703.4
Research and Development	4,962.4	11,116.7	17,061.0	13,876.0	47,016.1
Policy Development	933.6	1,093.1	1,234.2	1,305.8	4,566.7
Administration	3,792.6	7,150.5	10,840.9	11,306.3	33,090.3
O.E.C.	—	325,000.0	55,589.9	72,414.8	453,004.7
O.E.B.	1,443.9	1,862.8	2,316.4	2,569.7	8,192.8
TOTAL	25,769.2	366,113.9	112,069.7	119,621.2	623,574.0

Table 4

1984 PROGRAM EFFECTS
ENERGY EFFICIENCY IN ONTARIO

	1981	1982	1983	1984	1985	2000
Industrial Consumption Per Industrial GDP (TJ/10⁶$)	43.40	42.70	44.80	45.60	45.80	48.60
Residential Consumption Per Household (GJ/Household)	153.10	150.40	139.80	139.00	138.10	109.20
Commercial Consumption Per Floor Space (GJ/m²)	2.65	2.65	2.53	2.51	2.49	1.88
Transportation Consumption Per Reg'd Vehicle (GJ/Veh.)	100.80	94.10	92.90	91.10	88.70	61.60
TOTAL SECONDARY ENERGY PER CAPITA (GJ/CAPITA)	255.1	236.9	238.1	241.7	242.1	266.2
TOTAL SECONDARY ENERGY PER GDP (TJ/10⁶$)	47.3	46.5	45.6	45.1	44.3	35.4

Table 5

1984 PROGRAM EFFECTS
OIL CONSUMPTION AS PERCENTAGE OF TOTAL SECTORAL CONSUMPTION

	1981	1982	1983	1984	1985	2000
Industrial	15	12	12	14	14	12
Transportation	100	99	99	99	98	90
Residential	25	22	19	19	18	5
Commercial	16	15	13	13	12	5
TOTAL	41	38	38	37	36	28

Table 6

ONTARIO'S SECONDARY ENERGY CONSUMPTION (PETAJOULES) (BY SECTOR)

	1981	1982	1983	1984	1985	2000
Industrial	814.0	732.0	779.0	813.0	835.0	1,235.0
Transportation	605.0	554.0	570.0	565.0	557.0	635.0
Residential	456.0	453.0	465.0	470.0	474.0	453.0
Commercial	325.0	280.0	283.0	287.0	290.0	348.0
TOTAL	2,200.0	2,019.0	2,097.0	2,135.0	2,156.0	2,671.0
GROSS DOMESTIC PRODUCT (CONSTANT 1971 DOLLARS)	46,513	44,347	45,769	47,322	48,710	75,500
PROVINCIAL POPULATION (THOUSANDS)	8,625.0	8,694.0	8,764.0	8,834.0	8,904.0	10,035.0

Table 7
ONTARIO'S SECONDARY ENERGY CONSUMPTION (PETAJOULES) (BY FUEL)

	1970	1975	1980	1985	2000
Oil	870.0	928.0	961.0	782.0	759.0
Gas	437.0	613.0	697.0	707.0	912.0
Electricity	228.0	290.0	351.0	377.0	532.0
Coal	233.0	190.0	209.0	207.0	310.0
Other	—	—	57.0	83.0	158.0
TOTAL	1,768.0	2,021.0	2,275.0	2,156.0	2,671.0
GROSS DOMESTIC PRODUCT (CONSTANT 1971 DOLLARS)	32,864	40,486	45,306	48,710	75,500

Table 8
ONTARIO'S PRIMARY ENERGY CONSUMPTION (PETAJOULES)

	1970	1975	1980	1985	2000
Oil	1,080.0	1,171.0	1,291.0	1,041.0	1,070.0
Gas	472.0	705.0	749.0	746.0	963.0
Nuclear	10.0	196.0	400.0	557.0	996.0
Coal	436.0	353.0	491.0	439.0	544.0
Hydraulic	412.0	405.0	423.0	420.0	453.0
Other	—	—	57.0	85.0	163.0
TOTAL	2,410.0	2,830.0	3,411.0	3,288.0	4,189.0
GROSS DOMESTIC PRODUCT (CONSTANT 1971 DOLLARS)	32,864	40,486	45,306	48,710	75,500

Table 9
ONTARIO'S PRIMARY ENERGY PRODUCTION (PETAJOULES)

	1970	1975	1980	1985	2000
Oil	5.6	4.2	4.2	2.8	1.7
Gas	13.1	11.5	13.5	16.8	16.8
Nuclear	10.0	196.0	400.0	557.0	996.0
Coal	—	—	—	—	—
Hydraulic	412.0	405.0	423.0	420.0	454.0
Other	—	—	57.0	75.0	105.0
TOTAL	440.7	616.7	897.7	1,071.6	1,573.5
GROSS DOMESTIC PRODUCT (CONSTANT 1971 DOLLARS)	32,864	40,486	45,306	48,710	75,500

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For further information on energy, please call our Inquiries section at 965-3246, or call toll-free 0-Zenith 80420. Or write to: Ontario Ministry of Energy
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Ontario

Ministry of Energy

Honourable Philip Andrewes
Minister